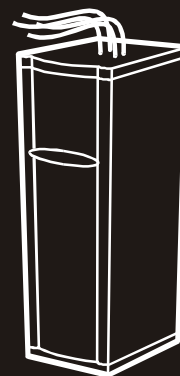


## 150 kW InfraStruXure PDU

**PD150G6F**  
**PD150L6F**

**Operation and Configuration**

**480V/ 600V Input**





# About this Manual

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This manual is intended for end-users of a 150kW InfraStruXure PDU. It covers the operation and quick-configuration of the PDU, and includes basic InfraStruXure system operation.

For additional information about the InfraStruXure system, see the *InfraStruXure Installation and Start-Up Manual* (990-1983), which covers the installation and start-up of UPS power distribution to the rack and power distribution within the rack.

For information about specific components in your InfraStruXure system, see the documentation included with each component. Before installing or operating any component, refer to the safety instructions in the component's manual.

The illustrations of products in this manual may vary slightly from the products in your InfraStruXure system.



You can check for updates to this manual by clicking on the User Manuals link on the Support page of the APC Web site (**[www.apc.com](http://www.apc.com)**). In the list of InfraStruXure Manuals, look for the latest letter revision (A, B, etc.) of the part number on the back cover of this manual.



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# Safety

## Overview

---

### Save these instructions

This manual contains important instructions that must be followed during installation, operation, and configuration of the InfraStruXure PDU.

### Safety symbols used in this manual



Indicates an electrical hazard, which, if not avoided, could result in injury or death.



Indicates a hazard, which, if not avoided, could result in personal injury or damage to the product or other property.



Indicates a potential hazard which could result in damage to product or other property.



Indicates important information.



Indicates a heavy load that should not be lifted without assistance.



Indicates a standby state. When in standby, the unit is not operating, but it may still contain hazardous voltage. It is not safe to service until the equipment is disconnected from all sources of electrical power.

### Cross-reference symbols used in this manual



Indicates that more information is available on the same subject in a different section of this manual.



See also

Indicates that more information is available on the same subject in a different manual.

# Warnings

---

## Receiving/moving

Do not tilt the PDU greater than 45° from its vertical axis. Never lay the PDU on its side.

## Installation/maintenance

Only a certified electrician can:

- Connect the PDU to its power source
- Connect a switch to the EPO interface on the PDU
- Install a customer-specified, hard-wired power cable

Only a certified electrician or an APC Field Service Engineer can perform maintenance of the PDU.

When connecting the PDU to utility, you must install a circuit breaker to protect the PDU against over-current. Determine the type of circuit breaker you need to install:

Input Voltage	Circuit Breaker Size
480 V	225 A
600 V	200 A

## Maintenance performed while the PDU is receiving input power

APC does not recommend that you perform maintenance of the PDU while it is receiving input power. However, due to the critical nature of data center loads, this may occur. If you must perform maintenance while the PDU is receiving input power, observe the following precautions to reduce the risk of electric shock:

1. Never work alone.
2. Perform the maintenance only if you are a certified electrician who is trained in the hazards of live electrical installation.
3. Know the procedure for disconnecting electricity to the PDU and the data center in case of an emergency.
4. Wear appropriate personal protective equipment.
5. Use double-insulated tools.
6. Always follow local and site regulations when working on the PDU.

## Total power off procedure

1. Set the PDU **Main Input** switch to OFF.
2. Set the upstream circuit breaker of the power source to OFF.

## Emergency Power Off (EPO)

Hazardous voltage from the branch circuit must be isolated from the 24VAC, 24VDC, and contact closure. 24VAC and 24VDC are considered Class 2 circuits as defined in Article 725 of the National Electrical Code (NFPA 70) and Section 16 of the Canadian Electrical Code (C22.1).

A Class 2 circuit is a source having limited voltage and energy capacity as follows:

- a. If an Inherently Limited Power Source, voltage and energy are limited to less than 30VAC, less than 30VDC, and 8A.
- b. If not an Inherently Limited Power Source, voltage and energy are limited to less than 30VAC, less than 60VDC, 250VA, and the current is limited to  $1000/V_{max}$ . The fuse is limited to 5A if less than 20VAC or 20VDC, or  $100/V_{maximum}$  if less than 30VAC or 60VDC.

If you choose to use a 24VAC, 24VDC, or contact closure connection to the EPO, use one of the following UL-listed wire types:

- CL2 Class 2 cable for general purpose use
- CL2P Plenum cable for use in ducts, plenums, and other space used for environmental air
- CL2R Riser cable for use in a vertical run shaft from floor to floor
- CL2X Limited Use cable for use in dwellings and for use in a raceway
- For installation in Canada, the cable should be CSA Certified, type ELC (extra-low-voltage control cable).

If you do not use a CL2 cable, route the EPO wiring in conduit that does not contain any branch circuit wiring.

## **EMI**

This equipment has been tested and found to comply with the limits for Class A digital devices, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with this user manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference. The user will bear sole responsibility for correcting such interference.

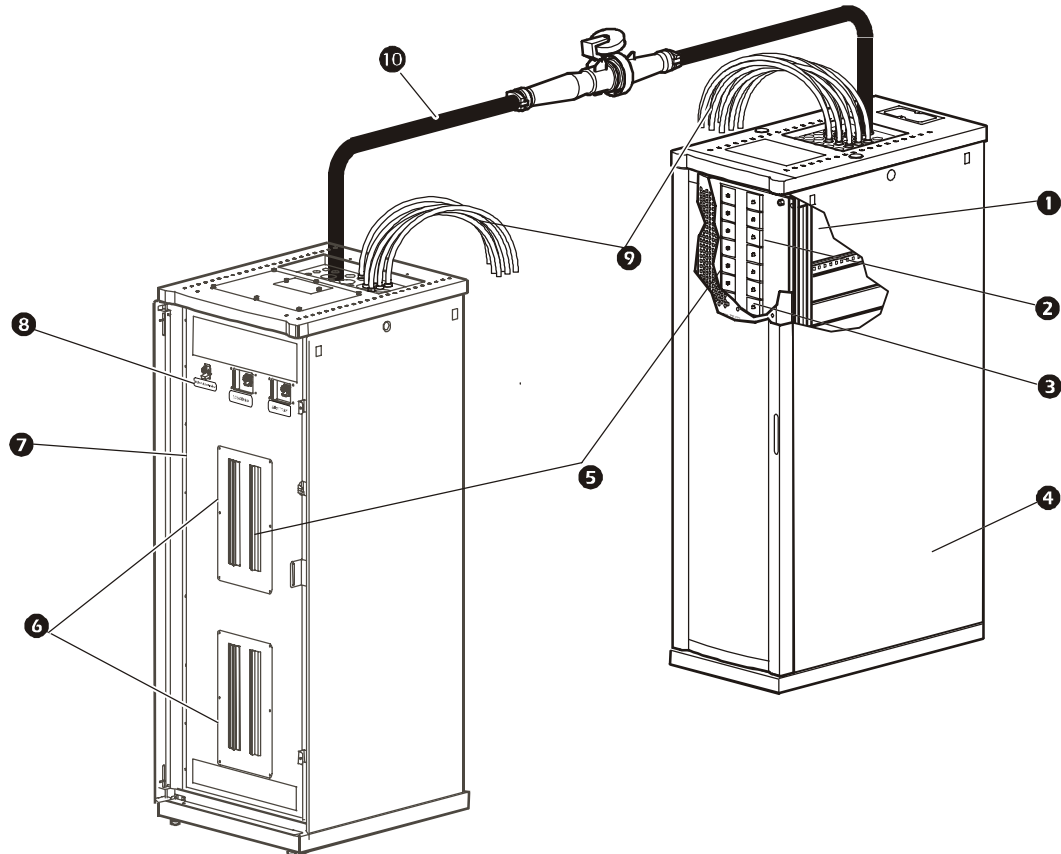
*This Class A digital apparatus complies with Canadian ICES-003.*

*Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.*

# Overview

## InfraStruXure PDU Components

The APC 150kW InfraStruXure PDU provides distribution and management of electrical power. The InfraStruXure PDU has the capacity of 150kW, accepts 480 V or 600 V 3-phase input, and distributes 208 V 3-phase power to equipment racks and Rack Distribution Panels (RDPs). The RDPs sit in the top 10U of specially-designed NetShelter VX enclosures and distributes power to equipment racks. The InfraStruXure PDU is housed in a specially-designed 23-inch NetShelter VX Enclosure. Each 150kW InfraStruXure PDU has seventy-five (75) pole positions available for feeding equipment racks and three (3), three-pole positions available for feeding RDPs. Each RDP has thirty-nine (39) pole positions available for feeding equipment racks and one (1), three-pole position that back-feeds the RDP.



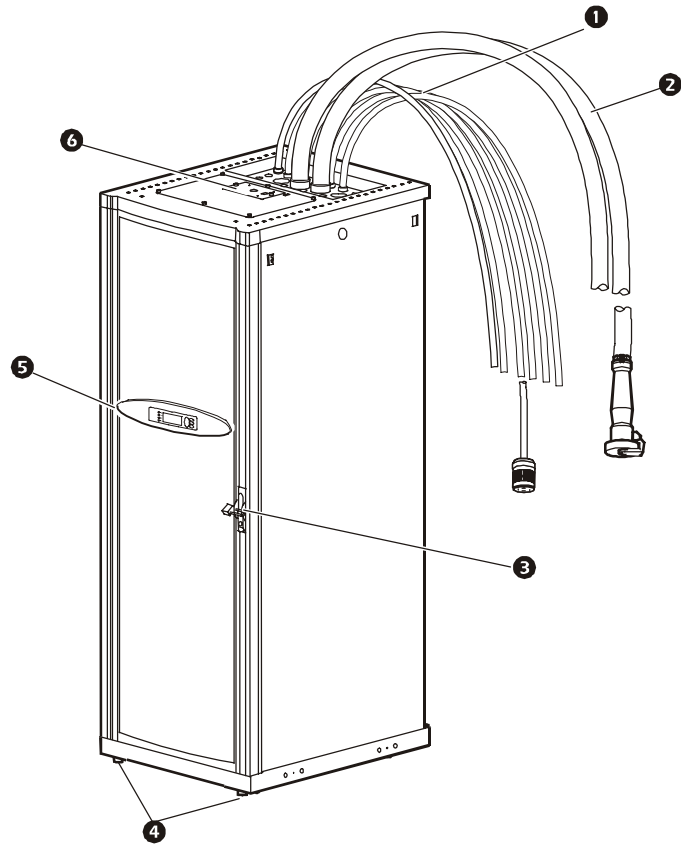
- |  |   |
|--|---|
| ① Rack Distribution Panel (RDP)            | ⑥ 75 pole positions available                 |
| ② 39 pole positions available              | ⑦ 150kW InfraStruXure PDU                     |
| ③ One, 3-pole breaker back-feeding the RDP | ⑧ Three circuit breakers sub-feeding the RDPs |
| ④ NetShelter VX Enclosure                  | ⑨ Power cables feeding equipment racks        |
| ⑤ 42-position circuit breaker panel        | ⑩ Sub-feed power cable feeding the RDP        |

# InfraStruXure PDU

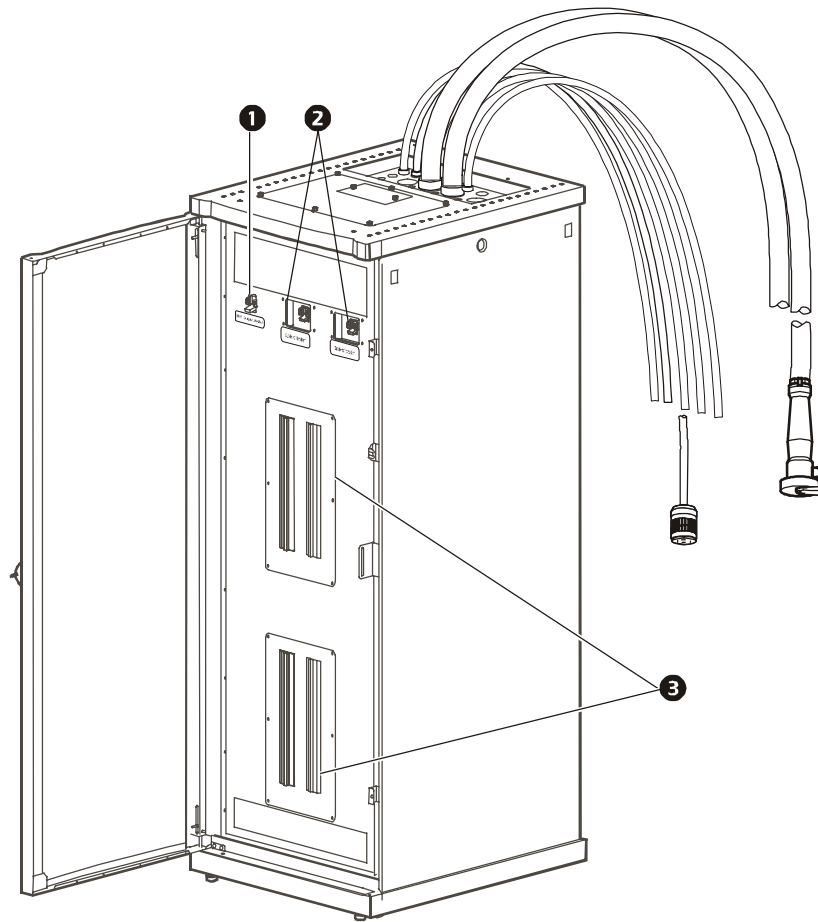
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## Front view

- 1 The **PDU power cables** feed equipment racks; they are fed through the knockout panels on the top of the PDU. There are the following two options for PDU power cables: multi-circuit power cables that terminate with an L21-20 outlet (shown) and single-circuit power cables that terminate with an L6-30 outlet. The number of power cables installed in the PDU depends on your system configuration. Each power cable accepts a variety of APC InfraStruXure rack-mount power distribution accessories.

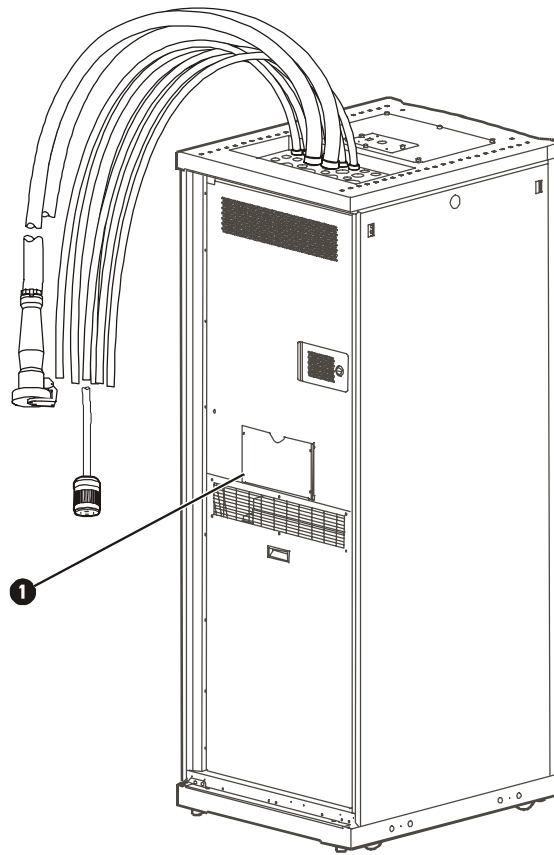


- 2 The **sub-feed power cables** are fed through the knockout panels on the top of the PDU and are an option for feeding RDPs. The power cables consist of five wires: three phases, one neutral, and one ground. You can have up to four sub-feed power cables. If you ordered this option, each power cable has an IEC 309 outlet.
- 3 A **lock-out bracket** allows for a padlock to be applied to the door to lock access to the PDU switches and breakers.
- 4 The **leveling feet** adjust to level the enclosure. All enclosures must be level before installation of the system begins.
- 5 The **display interface** provides a local interface for viewing status data. It has an LCD, five-button interface, basic status lights, and a beeper. See “PDU Display Interface” on page 11 for more information.
- 6 The **user connection plate** is connected to the PDU monitoring unit and provides easy access to input contact, relay output, network, and EPO connections. Make connections from inside the enclosure and route wires through the knockout provided on the plate. See “User connection plate” on page 12 for more information.

**Front view (interior)**

- ❶ The **Main Output** circuit breaker protects the distribution circuit breaker panels.
- ❷ The **optional sub-feed output** circuit breakers offer a means to distribute higher blocks of power to other equipment or distribution units.
- ❸ The **42-position circuit breaker panels** provide 84 total pole positions. Each single pole provides power at 120 volts L-N or two single poles provide 208 volts L-L. The amperage each position provides depends on the size of the circuit breaker used.

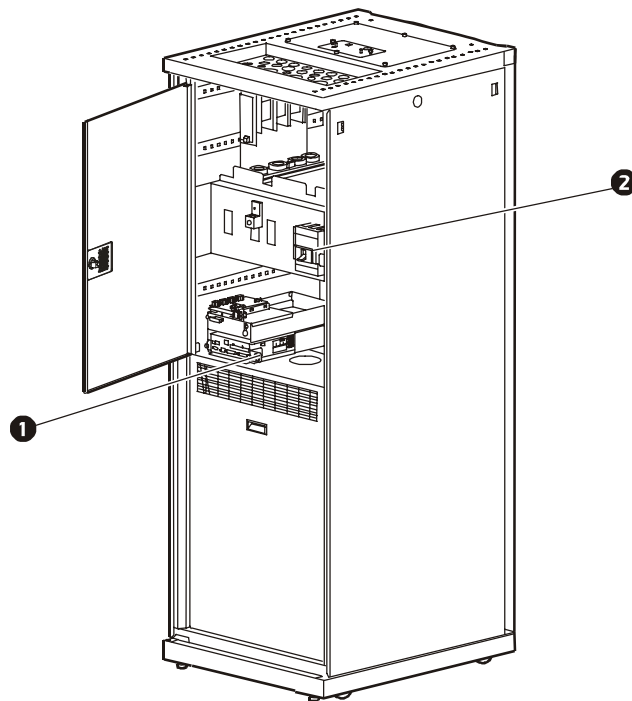
## Rear view



- ❶ The **document pocket** provides storage of documents related to the InfraStruXure PDU.

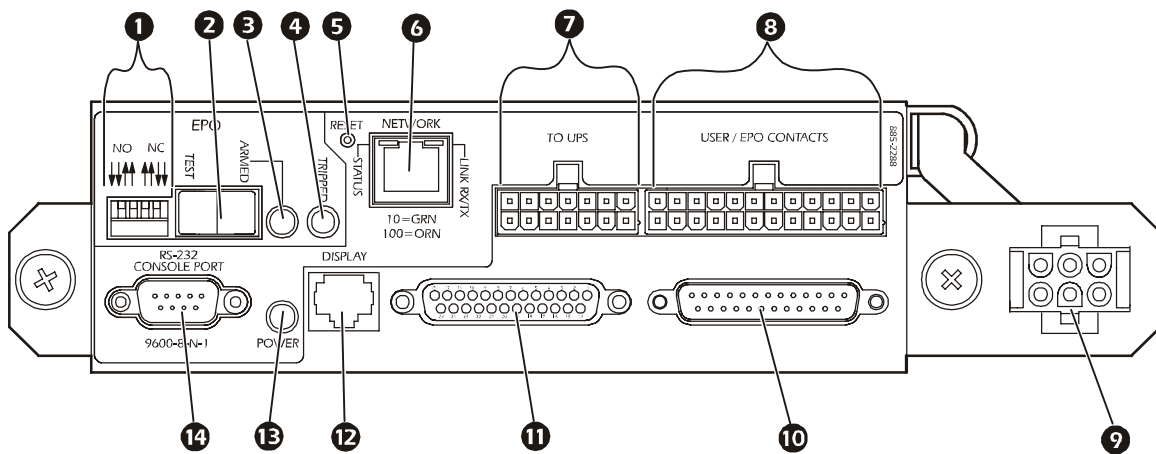


## Rear view (interior)



- ❶ The **PDU monitoring unit** receives signals from several current and voltage monitoring boards that report to a central board assembly located in the PDU monitoring unit. The monitoring unit has one 10 Base-T (Cat-5) connection to the Information Controller Hub (or switch), four relay output connections, four input contact connections, and one EPO input connection. Make these connections at the user connection plate located on the roof of the PDU. See “PDU monitoring unit” on page 10 for a more detailed description.
- ❷ The **Main Input** breaker connects to your main power source. The breaker accepts 480 V input and requires 3-wire input conductors.

## PDU monitoring unit



- ❶ The **EPO DIP switches** configure the EPO input for the type of EPO switch that is connected—Normally Open (NO) or Normally Closed (NC).
- ❷ When the **EPO Arm/Test rocker** is in the Test position, engaging the EPO switch will not cause the load to be powered off. When the rocker is in the Armed position, engaging the EPO switch will cause the PDU’s main input switch to be switched OFF. See “How to Connect an EPO Switch to the PDU and Test the Switch” on page 56 for more information on testing the EPO switch.
- ❸ The **EPO Armed LED** is green when the rocker is in the Armed position. The LED is dark when the rocker is in the Test position.
- ❹ The **EPO Tripped LED** is red when the EPO switch is engaged (the EPO button is pressed), regardless of the state of the EPO Arm/Test rocker.
- ❺ The **Reset** button resets the network processor; it does not reset the PDU or the PDU monitoring unit.
- ❻ Connect to the InfraStruXure Manager through the **network port**.
- ❼ Not used in this model PDU.
- ❽ The optional **User/EPO Contacts** port is connected to wire harnesses that connect to the User Connection Plate in the roof (or floor) of the PDU. The port allows for four (4) relay outputs, four (4) input contacts, and one (1) EPO input. See “User connection plate” on page 12 for more information.
- ❾ This connection provides the **input power** for the PDU monitoring unit from the circuit breaker on the front of the PDU. If the panel is on, and the monitoring unit circuit breaker is closed, the monitoring unit is powered.
- ❿ Connects to sensors monitoring values such as voltage, current, and power.
- ⓫ Digital input sensing for monitoring such as circuit breaker status, transformer temperature, fans, etc.

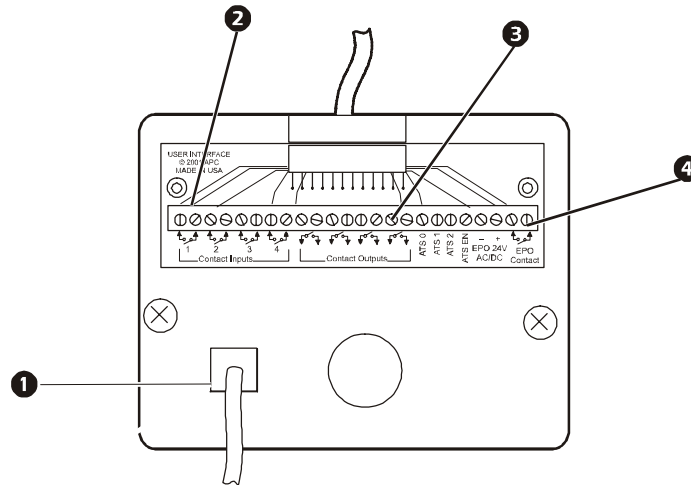
- ⑫ The **Display port** (RJ-45) connects the PDU monitoring unit to the display interface.
- ⑬ The **Power LED** indicates whether the monitoring unit is receiving power.
- ⑭ Use the **Console port** (DB-9) to connect a laptop computer to the monitoring unit using an appropriate communication cable. This port is used to configure items relating to servicing the PDU.

**Note**

The branch current monitoring boards connect to the **Branch Current Monitor** ports (RJ-11). These ports are on the side of the PDU monitoring unit, and are labeled on the face of the unit. Each port corresponds to a section of circuit breakers on the PDU distribution circuit breaker panel: upper left = [01..41]; upper right = [02..42]; lower left = [43..83]; lower right = [44..84].

## User connection plate

For a description and location of the user connection plate, see (6) on page 6. For clarity, the user connection plate in the illustration below is shown in greater detail.

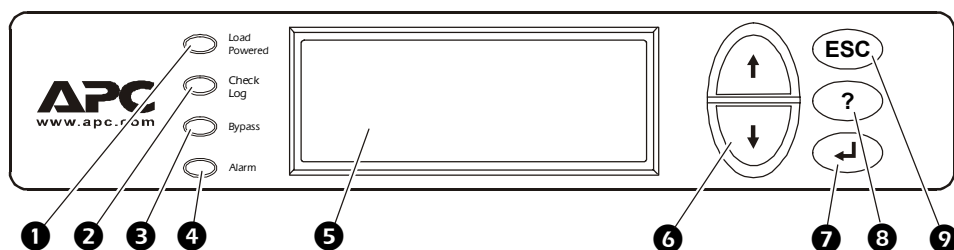


- ❶ Connect the InfraStruXure PDU to the network or the InfraStruXure Manager through the **ethernet port**.
- ❷ The user connection plate has four **input contact connections** for monitoring Normally Open (NO) or Normally Closed (NC) dry contacts. See page 20 and page 58 for more information.
- ❸ The user connection plate has four **relay output connections** for connection of Normally Open (NO) or Normally Closed (NC) dry contacts. See page 20 and page 58 for more information.
- ❹ Connect an Emergency Power Off (EPO) switch at one of three choices of **EPO connections** (24 VDC, 24 VAC, or contact closure). See page 60 for more information.

# PDU Display Interface

## Overview

Use the display interface to configure settings, set alarm thresholds, and provide audible and visual alarms.



❶	<b>Load Powered LED</b>	When green, all output phases are within the limits specified by the output alarm limit thresholds.
❷	<b>Check Log LED</b>	When yellow, at least one new alarm condition has been detected.
❸	<b>Bypass LED</b>	Not used on this model PDU.
❹	<b>Alarm LED</b>	When red, an alarm condition exists.
❺	<b>LCD</b>	View alarms, status data, instructional help, and configuration items.
❻	<b>Up and Down navigation keys</b>	Selects menu items and accesses information.
❼	<b>ENTER key</b>	Opens menu items and input changes to system parameters.
❽	<b>HELP key</b>	Launches context-sensitive help. Press the HELP key for information about each item on the screen and for instructions on how to perform certain tasks.
❾	<b>ESC key</b>	Returns to previous screen displayed.

## Top-level status screens

After system start-up, the display interface displays a brief start-up screen and then scrolls automatically and continuously through four screens of basic status information. Press the Up and Down arrow keys to interrupt the automatic scrolling if you wish to view a specific status screen.

<b>Volts In</b> L1-2: 000 L2-3: 000 L3-1: 000	<b>Volts Out</b> L1: 000 L2: 000 L3: 000	<b>Load Current</b> L1: 000 L2: 000 L3: 000 Neut:000
<b>Total Output Loading</b> kW: 000 kVA: 000 Freq: 00.0	PF: 000 %LD: 000	<b>No Active Alarms</b> <b>System Date/Time:</b> Jun-24 2003 07:58

## Top-level menu screen

On any top-level status screen, press the ENTER key to open the top-level menu screen.

→ Load-Meter	Alarms
Volt-Meter	Panel
Contacts	Config
Breakers	Help



### Note

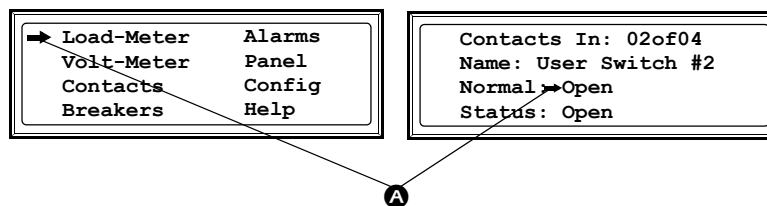
If the display interface is inactive for the time specified as the **Time-out** setting, it reverts to the initial basic monitoring screens.



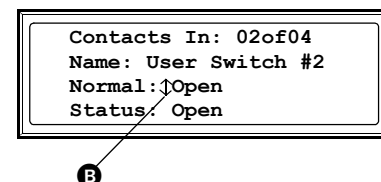
For descriptions of the top-level menu choices, see the individual sections starting on page 16.

## Navigating through screens

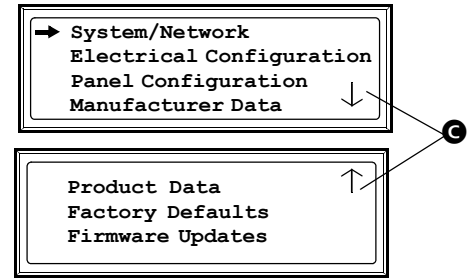
To open any screen, press the Up and Down arrow keys until the selector arrow (A) rests next to your desired selection. Press the ENTER key to view the selected screen.



When configuring settings, press the Up and Down arrow keys until the selector arrow (A) rests next to the setting you want to change, and press the ENTER key. If the setting is a list of choices, an input arrow (B) will appear next to the setting. Press the Up and Down arrow keys until your desired change is listed. Press the ENTER key to select the setting.



On some screens, continue arrows (⌂) indicate that there are additional screens to view in the category. Press the Up or Down arrow key to view the additional screens.



## Password-protected screens

When configuring or changing settings, you will be prompted for your password. To enter your password:

1. Press the Up or Down arrow key until the correct letter is displayed, and then press the ENTER key.



**Note**

After you press the ENTER key, the character you entered is displayed as an asterisk and the input arrow moves to the next space for you to select the next password character.

2. Press the ENTER key twice after you enter your password.



See “System Password” on page 28 to change your password.

# Load-Meter Screen

---

From the **Load-Meter** screen, you can select the following items:

**Total Load by Phase** The load supported by each phase in kilovolt-amperes (**kVA**), in RMS current (**I<sub>rms</sub>**), and as a percentage of the maximum allowable load (**%LD**).

**Total Load Summary** For the total load supported:

- **kW**: The power provided, in kilowatts.
- **kVA**: The actual power drawn by the load, in kilovolt-amperes.
- **Freq**: The frequency.
- **PF**: The power factor, which affects the power available to the load.
- **%LD**: The load as a percentage of the maximum allowable load.

**Power Factor** For each phase:

- **kVA**: The actual power drawn by the load, in kilovolt-amperes.
- **kW**: The power, in kilowatts, provided by the phase.
- **PF**: The power factor (kW/kVA) that affects the power available to the load.



# Volt-Meter Screen

---

From the **Volt-Meter** screen, you can select the following items:

- Output Voltage** Displays each phase-to-phase output voltage (e.g., **L1-2** for phase L1 to phase L2) and each phase-to-neutral output voltage (e.g., **L1** for phase L1 to neutral).
- Input Voltage** Displays each phase-to-phase input voltage (e.g., **L1-2** for phase L1 to L2), or, if your service transformer is a Wye transformer, each phase-to-neutral input voltage (e.g., **L1** for phase L1 to neutral).

# Contacts Screen

---

The PDU can monitor external contact closure events. Possible applications include the following:

- Magnetic contact switches
- Window foil
- Tamper switches
- Heat detectors
- Water sensors
- Pressure sensors
- Building smoke and fire detection systems

You can set input contacts to cause alarm conditions based on their current state and a user-defined normal state. Relay outputs can map internal alarms and events to outside devices.

Use the **Contacts** screen to display and configure information about input contacts and relay outputs. The options that you can select from the **Contacts** screen are as follows:

## Input Contacts

Scroll through the list to display information about each of the installed input contacts. For example, **02of04** displays information about the second of four installed input contacts.

- **Name**—The name of this contact input (*Maximum:* 14 alphanumeric characters).
- **Normal**—The normal position of this input contact, either **Open** or **Closed**.
- **Status**—The position of this input contact. If the position is not the normal position, an alarm condition occurs.

## Relay Outputs

Scroll through the list to display information about each of the installed relay outputs. For example, **04of04** displays information about the fourth of the four available relay outputs.

- **Name**— The name of the relay output (*Maximum:* 14 alphanumeric characters).
- **Normal**— The normal position of this relay output, either **Open** or **Closed**.
- **Status**—The position of this relay output.

See “Relay Outputs” on page 57 for relay output specifications.

## Alarm Relay Map

Configure the relay outputs, using the Alarm Relay Map. Each Alarm Map corresponds to a relay output. For example, Alarm Map

Alarm Map: 01 of 04 [Vo, By, C4] → Map: Input Voltage Apply Now
--

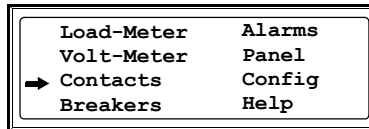
**01of04** corresponds to the first of four relay outputs. The second line, in brackets [ ], lists the items that you have selected to map to the selected relay. The third line allows you to select the alarms to which you want to map the relay:

- **Any Load (L)**—Maps to over- or under-current alarms for circuit breaker panels and branch circuits.
- **Overload (O)**—Maps to over-current alarms for circuit breaker panels, branch circuits, and SYSGND.
- **Input Voltage (Vi)**—Maps to any input voltage alarm.
- **Output Voltage (Vo)**—Maps to any output voltage alarm.
- **PDU in Bypass (By)**—Not used on this model PDU.
- **Any Breaker (Br)**—Not used on this PDU.
- **Contacts 1–4 (C1,C2,C3,C4)**—Maps to the input contact alarms.

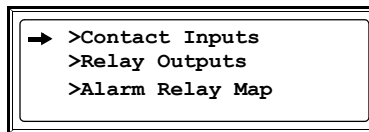
Before exiting the screen, to save your changes, select the **Apply Now** option on the bottom line of the screen. You will then be asked to confirm your changes.

**How to connect contacts to the PDU monitoring unit.**

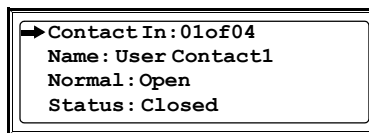
1. Choose one or more contact number (s) on the User/EPO contacts port on the user connection plate to which you will connect the contacts. The user connection plate connects to the PDU monitoring unit.
2. From the PDU display interface:
  - a. Press the ESC or ENTER key to go to the top-level menu screen.
  - b. Select **Contacts** on the top-level menu screen, and press the ENTER key.



- c. Select **Contact Inputs** and press ENTER to display the contact inputs screen.



- d. Select **Contact In** and press the ENTER key to select the number of the contact you are connecting. The continue arrow ↓ will appear next to the contact number.



- e. Press the Up or Down arrow key to select the appropriate contact number, and press the ENTER key.
  - f. Press the Down arrow key to enter a unique **Name** for the contact and to configure the **Normal** state of the contact (Open or Closed). The default **Normal** state is Open. Press the ENTER key to select the item to configure.

**Note**

You will be prompted for your password to configure these items.

3. Connect contact wires (300V-rated cabling required) to the **User Contacts** terminal block on the user connection plate. You will need a 2.5-mm standard screwdriver.
4. Run the wires from the terminal block out the roof or under the floor of the PDU to your contact's location.



**Ensure that wires are properly retained and away from high voltage lines and breakers.**

# Breakers Screen

---

Use the Breakers screen to view the status of the system and PDU circuit breakers.

## **Main Input**

Reports status of PDU Main Input breaker (**Open** or **Closed**).  
Under normal operation, this switch is **Closed**.

# Alarms Screen

---

## View Active Alarms

Use this option of the **Alarms** screen to display active alarms (alarms that have not been resolved). Scroll through the list to view each active alarm.

## Alarm/Event Log

Use this option of the **Alarms** screen to access the following options:

- |                         |  |
|-------------------------|--|
| <b>New Logged Items</b> | Display a description and the date and time of each alarm that occurred since the last time this option was used. The date/time format is <i>mm/dd/yyyy hh:mm:ss</i> . <ul style="list-style-type: none"><li>• The most recent alarm is displayed initially.</li><li>• If the log contains no alarms, the screen displays No New Logged Items.</li></ul>   |
| <b>Entire Log</b>       | Display a description and the date and time of each alarm in the alarm log. The date/time format is <i>mm/dd/yyyy hh:mm:ss</i> . <ul style="list-style-type: none"><li>• The most recent alarm is displayed initially. To move to the previous alarm, press the Up arrow key. To move to the next more recent alarm, press the Down arrow key.</li><li>• If the log contains no alarms, the screen displays No New Logged Items.</li></ul> |
| <b>Clear Log</b>        | Delete the contents of the alarm log. You will be asked to confirm this deletion.  |

## Alarm Setup

Use this option of the **Alarms** screen to access the following options:

- |                            |  |
|----------------------------|--|
| <b>Loading Limits</b>      | <p>Configure the following in amps and as a percentage of full load:</p> <ul style="list-style-type: none"> <li>• <b>Out High:</b> The upper limit for output current</li> <li>• <b>Out Low:</b> The lower limit for output current</li> <li>• <b>Out Neut:</b> The upper limit for current on the neutral wire for the output phases</li> </ul>   |
| <b>Voltage Limits</b>      | <p>Configure the following as a percentage under or over the rated voltage:</p> <ul style="list-style-type: none"> <li>• <b>Input:</b> The allowed range for input voltage</li> <li>• <b>Output:</b> The allowed range for output voltage</li> </ul>   |
| <b>Other Limits</b>        | <p>Configure these limits:</p> <ul style="list-style-type: none"> <li>• <b>Frequency:</b> The frequency variation, in hertz, that is acceptable for the output current.</li> <li>• <b>Gnd Current:</b> The ground current, in amps, that is acceptable.</li> </ul>   |
| <b>Global Alarm Config</b> | <p>Set all the loading limits or all the voltage limits simultaneously as a percentage of full load:</p> <ul style="list-style-type: none"> <li>• <b>Load Limits:</b> Set the same percentage for the upper limit for output current, the lower limit for output current, and the upper limit for current on the neutral wire for the output phases. (Use the <b>Loading Limits</b> option to set these thresholds individually).</li> <li>• <b>Volt Limits:</b> Set the same percentage for the high and low thresholds for input and output voltage. (Use the <b>Voltage Limits</b> option to set these thresholds individually.)</li> </ul> |

Select **Apply Now** and then **YES** to implement your changes.



**Note**

If an alarm limit has been disabled, “OFF” is displayed.

## Alarm Beeper

Use this option of the **Alarms** screen to turn the alarm beeper ON or OFF.

## PDU Alarms

This table lists all alarms that can be generated by the InfraStruXure PDU, as displayed by the **All Possible Alarms** option, with numeric variables between the < > characters. Logged alarms will display specific numbers instead.

Alarm Condition	Explanation
Input V <Ln-N>=<Value> Voltage Under Limit	Input voltage of the phase indicated has dropped below the configured lower limit.
Input V <Ln-N>=<Value> Voltage Over Limit	Input voltage of the phase indicated exceeded the configured upper limit.
Output V <Ln-N>=<Value> Voltage Under Limit	Phase-to-neutral output voltage for phase <L-N> dropped below the configured limit.
Output V <Ln-N>=<Value> Voltage Over Limit	Phase-to-neutral output voltage for phase <L-N> exceeded the configured limit.
Output I L<n>=<Value> Current Over Limit	Current of output phase <N> exceeded the configured limit.
Output I L<n>=<Value> Current Under Limit	Current of output phase<N> dropped below the configured limit.
Output Neut=<Value> Current Over Limit	Current on the neutral wire for the output phases exceeded the configured limit.
Output FDev=<Value> Freq Out of Range	Frequency of the output current is above or below the range that is configured as acceptable.
Input Transformer Temperature Too High	The temperature of the PDU transformer exceeded the normal limit, <i>if applicable</i> .
Main Breaker Open Alarm Active	The Main Input Switch is Off.
<User Contact Name> Alarm Active	A user-configured contact connected to the PDU monitoring unit is reporting an alarm condition.
No UPS Input Breaker Q1 Open	The Main circuit breaker is open, and the PDU is not receiving power from the UPS.
Branch Ckt Pos: <nn> Current Over Limit	Current on one of the poles of branch circuit breaker <i>nn</i> exceeded the configured limit.
Branch Ckt Pos: <nn> Current Under Limit	Current on one of the poles of branch circuit breaker <i>nn</i> dropped below the configured limit.
Fan Rotation Failure Alarm Active	There is a failure in one of the fans. The fan needs to be replaced, <i>if applicable</i> .



# Panel Screen

## Branch Ckt Loading

You can display **Branch Ckt Loading** (Branch Circuit Loading) status if the option to measure current at the distribution circuit breakers is installed.

You can view data for each individual panel position on the distribution panel. To view status of a panel position, select the range that includes the position:

```
Branch Ckt Loading
Select Range:
→ [01..41] [02..42]
   [43..83] [44..84]
```

The top line of selections on the screen applies to the top distribution circuit breaker panel on the PDU. The bottom line of selections applies to the bottom distribution circuit breaker panel on the PDU. The panel position numbers on the screen correspond to the numbers on the distribution panel. (Odd numbers are on the left; even numbers are on the right.)

Once you have selected the correct range, press the Up and Down arrow keys to scroll through the list of circuit breakers in the selected range. Poles that are tied together will be shown on the same screen.

```
Ckt: 03 of 21  Irms  %LD
05: 20A       11.3 56.5
```

In the example above, the screen shows the third circuit breaker of 21 circuit breakers in the selected range. This is a single-pole circuit breaker, occupying panel position 05. The circuit breaker is rated at 20 amps. The following data are displayed for each pole:

- **Irms**: Measured root mean square (RMS) current of the pole position.
- **%LD**: Present load as a percentage of rated load of the panel position.

## Branch Ckt Limits

Available only if the option to measure individual currents is installed, **Branch Ckt Limits** (Branch Circuit Limits) accesses a scrollable list of the circuit breakers in the panel. For each circuit breaker, the screen displays, in the **Loading** column, the current on each panel position. This number is shown as a percentage of the rated current. In the **Load Alarm** column, you can configure the high and low thresholds for the circuit breaker as a percentage of its rated current. For example, if you set 80% as the high threshold for a single-pole 20-amp circuit breaker, an alarm condition occurs if the current reaches 16 amps.



Measurements are displayed as blank when the monitor board is not detected.

## Panel Configuration

Configure the branch metering settings for each circuit breaker on the distribution panel, or configure both panels simultaneously.

To configure a circuit breaker, select the range that includes the circuit breaker. The selections on the top line on the screen apply to the top distribution circuit breaker panel on the PDU. The selections on the bottom line apply to the bottom distribution circuit breaker panel on the PDU. The panel position numbers on the screen correspond to the numbers on the distribution panel. (Odd numbers are on the left; even numbers are on the right.) Once you have selected the correct range, configure the settings for each circuit breaker in the range:

Panel Configuration	
Select Range:	
→ [01..41]	[02..42]

**Pos:** The panel positions in the selected range.

**Breaker:** Two configurable items:

- The circuit breaker rating, in amps
- The circuit breaker tie indicator: Define the number of panel positions tied (i.e., associated). You can associate positions with circuit breakers, which enables you to view status information about each circuit breaker and receive an alarm notification when any of a circuit breaker's poles are above or below the configured branch circuit limit. You can also tie together panel positions that are logically associated. For example, you can tie together panel positions for three separate circuit breakers that are connected to the same PDU power cord and that feed power to the same equipment enclosure.

To configure the values on this screen:

1. From the first column, use the arrow keys to scroll up or down to the pole position you want to configure.
2. Press the ENTER key to move to the item you want to configure in the third column (the circuit breaker rating or the circuit breaker tie indicator).
3. Scroll again to select the value you want for the circuit breaker rating or the circuit breaker tie indicator. To associate one panel position with the next position in the list, choose the + character as the tie indicator immediately following the circuit breaker rating. To indicate that the position is not associated with (tied to) the next panel position in the list, choose the ] character as the tie indicator immediately following the circuit breaker rating. When you change the + or ] character that follows the circuit breaker rating in one row, the + or ] character before the circuit breaker rating in the next row also changes to indicate the changed association between the panel positions.

For example, this screen shows three, single-pole, 20A, tied circuit breakers occupying positions 08, 10, and 12 on the top right distribution panel.

Pos	Breaker
→ 08	[ 20A +
10	+ 20A +
12	+ 20A ]

## **Global Panel Config**

Configures the same number of poles or circuit breaker ratings for all circuit breakers in both distribution panels simultaneously. For example, if your system uses only 3-pole, 20 amp circuit breakers, choose this option, scroll to the value 3 for **Poles** and 020 for **Amp Rating**, and then select **Apply Now** and **YES** to implement your changes.

# Config Screen

---

## System/Network

Use this option of the **Config** screen to access these options:

### System Password

- **Password:** Change the system password required to access protected screens and fields in the display interface. Enter a string of up to eight alphanumeric characters, followed by the underline character (   ) to indicate the end of the string. The default password is APC.
- **Time-out:** Set the time that the display interface waits for user input before it reverts to the initial scrolling of status screens. Select 1, 2, 5, 10 (the default), or 30 minutes; or 1, 2, or 4 hours, or Forever.
- **Invalidate NOW:** Re-enter the system password for viewing password-protected screens.

### Date/Time

- **Date:** Set in the following format: *dd-mmm yyyy*.
- **Time:** Set in the following format: *hh:mm:ss*.

### Local Interface

- **Contrast:** Set the screen contrast for the LCD. Select from 1 (high contrast) to 8 (low contrast).
- **Key Click:** Choose **On** for an audible click whenever you press a navigation key. Choose **Off** to disable the key click.
- **Beeper Volume:** Select **High**, **Medium**, **Low**, or **Off** to adjust the loudness of the audible beeper and the key click.

### Network Address

The following values are set by the InfraStruXure Manager during initial configuration:

- **IP:** The System IP address, which the domain name server translates into a domain name.
- **Mask:** The subnet mask, which identifies the subnetwork on which the InfraStruXure PDU operates.
- **GW:** The Gateway address. This is the physical address of the InfraStruXure PDU, expressed as a 48-bit hexadecimal number.

## Electrical Config

This option of the **Config** screen displays information about the electrical service that provides input to the InfraStruXure PDU. All of the values displayed on this screen are set at the factory. Use this information when viewing and setting alarms.

### Input Config

Configure the following items:

- **Main Input:** The voltage from the power source coming into the PDU main input switch.
  - 3W: 3-phase Delta, measured line-to-line
  - 4W: 3-phase WYE, measured line-to-neutral
- **Transformer:** Indicates whether the InfraStruXure PDU has a transformer.

### Output Config

Configure the following items:

- **Panel Voltage:** The nominal voltage of the distribution panels supplying power to the load equipment. (This is measured line-to-neutral.)
- **Panel Breaker:** The rating, in amps, of the circuit breaker feeding the distribution panels.

## Manufacturer Data

Use this option of the **Config** screen to display a scrollable list containing information about the InfraStruXure PDU. This information is useful when requesting service or product updates. The following information is displayed:

- Manufacturer Name
- Date of Manufacture
- Date of Calibration
- Hardware Revision
- Firmware Revision (for PDU Monitoring and Metering)
- Serial Number
- Model Number

## **System ID**

Use this option of the **Config** screen to identify your InfraStruXure PDU. The following fields can be configured:

- |                         |  |
|-------------------------|--|
| <b>Device Name</b>      | Set a unique name for your InfraStruXure PDU.  |
| <b>Product Location</b> | Name the physical location of the product in your data center.                             |
| <b>Product Contact</b>  | Identify the person to notify concerning questions or problems with regard to the product. |

## **Factory Defaults**

Use this option of the **Config** screen to reset all InfraStruXure PDU settings to their factory default values.

## **Firmware Updates**

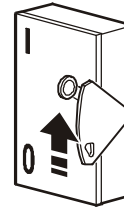
Use this option of the **Config** screen to download updated firmware to the InfraStruXure PDU.

# Operation

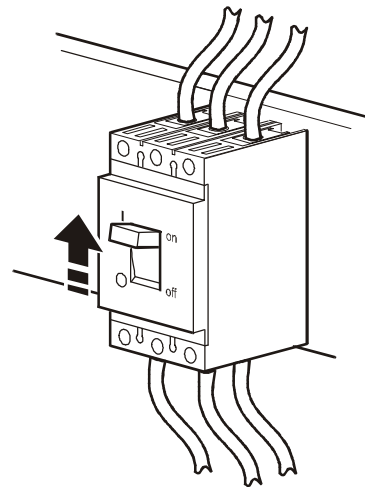
## How to Apply Power to the System

---

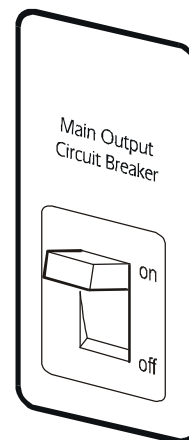
1. Close (turn ON) the main circuit breaker of the **power source** supplying power to the InfraStruXure PDU.



2. Close (turn ON) the **Main Input** on the InfraStruXure PDU.



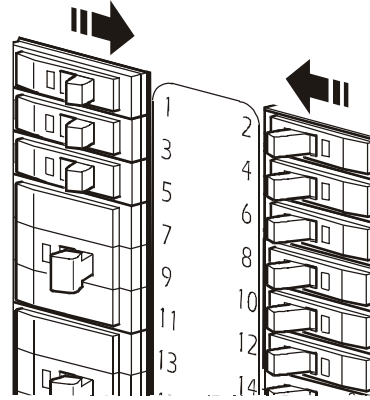
3. Power the PDU distribution circuit breakers:
  - a. Close (turn ON) the **Main Output** circuit breaker on the PDU.



**Note**

After the **Main Output** circuit breaker has been closed (turned ON), both PDU distribution panels will be energized.

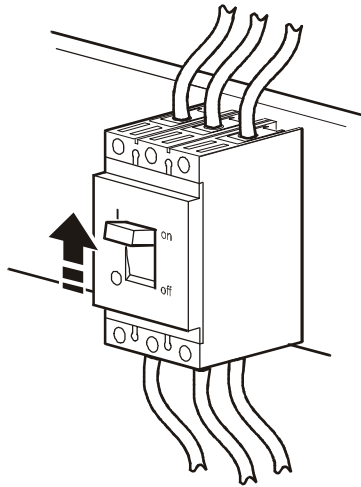
- b. Close (turn ON) the PDU **distribution panel** circuit breakers.



**Note**

When the **distribution panel** circuit breakers are closed (turned ON), the PDU power cables and connected equipment are energized.

- c. Close (turn ON) the subfeed breakers (if applicable).

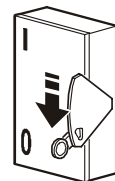




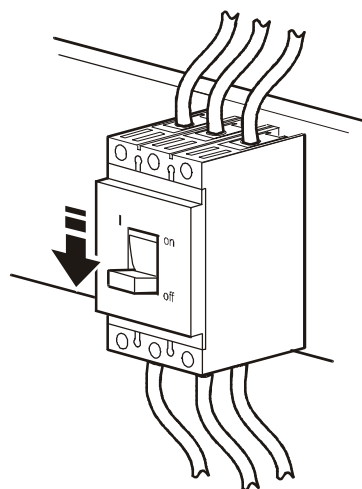
# How to Ensure Total Power Off

---

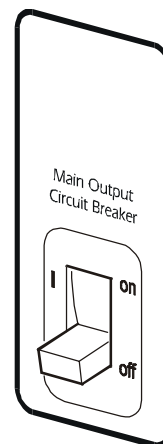
1. Open (turn OFF) the main circuit breaker on the **power source** feeding the PDU.



2. Open (turn OFF) the **Main Input** on the InfraStruXure PDU.



3. Open (turn OFF) the **Main Output** circuit breaker and subfeed circuit breakers (if applicable) on the front of the InfraStruXure PDU.





# Communication Configuration

## InfraStruXure PDU Management Options

---

### Overview

You have two management options for the InfraStruXure PDU. You can manage the InfraStruXure PDU along with the rest of your InfraStruXure equipment through the InfraStruXure Manager (APC LAN), or you can manage your InfraStruXure PDU through APC's network management interfaces (User LAN).

### InfraStruXure Manager

The InfraStruXure Manager is a rack-mount management device that coordinates the management functions of APC InfraStruXure-Certified devices installed in your data center. It provides one single interface to view and configure all APC InfraStruXure-Certified devices. See “Configuring the InfraStruXure Manager” on page 36 for configuration instructions.



See also

For more information about the InfraStruXure Manager, see the *Installation and Configuration* manual included with the InfraStruXure Manager.

### Network management interfaces

The control console and Web interfaces provide menus with options that allow you to manage the PDU. See “Configuring the Network Management Interface” on page 37 for configuration instructions.



See also

For more information about the internal user interfaces, see the InfraStruXure Power Distribution Unit online *Network Management User's Guide*.

The SNMP interface allows you to use an SNMP browser with the PowerNet<sup>®</sup> Management Information Base (MIB) to manage the PDU. See “Configuring the Network Management Interface” on page 37 for configuration instructions.



See also

To use the PowerNet MIB with an SNMP browser, see the *PowerNet<sup>®</sup> SNMP Management Information Base (MIB) Reference Guide*, which is provided on the InfraStruXure PDU *Utility CD*.

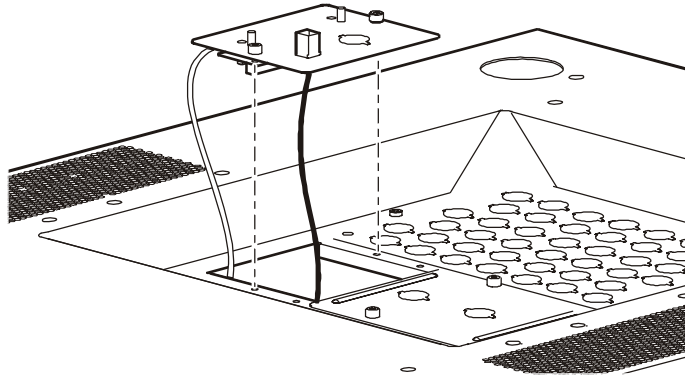
# Configuring the InfraStruXure Manager

---

## Connect the InfraStruXure PDU to the InfraStruXure Manager

1. Connect a Cat-5 network cable to the surge-protected ethernet port on the PDU user connection plate.

You can make connections from inside the enclosure, or you can remove the user connection plate and make your connections. Remove the plate using a Phillips or standard screw driver to loosen the two captive screws. Use the knockout in the plate to route cables to and from the user connections on the plate. If you remove the plate, make sure that you do not disturb the existing connections.



2. Run the connected Cat-5 network cable through the knockout in the user connection plate to the InfraStruXure Manager Hub.
3. Once all APC InfraStruXure-Certified equipment is installed, the network cables are connected to the InfraStruXure Manager Hub, and start-up of the system is complete, configure the InfraStruXure Manager.



See also

For detailed configuration instructions, see the InfraStruXure Manager *Installation and Quick-Start* manual included with your InfraStruXure Manager.

# Configuring the Network Management Interface

---

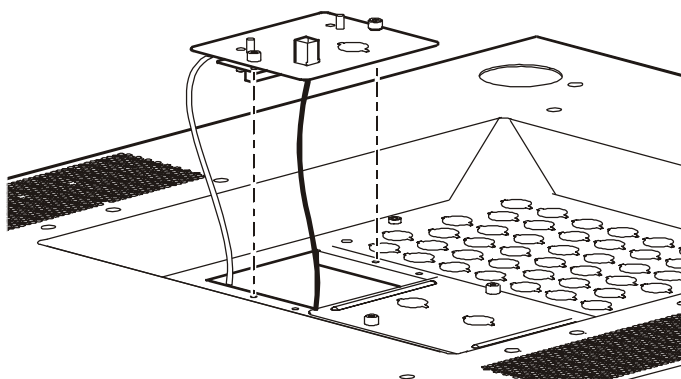
## Connect the InfraStruXure PDU to your network

1. Connect a Cat-5 network cable to the surge-protected ethernet port on the PDU user connection plate.

You can make connections from inside the enclosure, or you can remove the user connection plate and make your connections.

Remove the plate using a Phillips or standard screw driver to loosen the two captive screws. Use the knockout in the plate to route cables to and from the user connections on the plate. If you

remove the plate, make sure that you do not disturb the existing connections.



2. Run the connected Cat-5 network cable through the knockout in the user connection plate to your network connection.
3. Configure the TCP/IP settings of the InfraStruXure PDU. See “Configuration Overview” on this page for further instructions.

## Configuration Overview

You must configure the following TCP/IP settings before the InfraStruXure PDU can operate on a network:

- IP address of the InfraStruXure PDU
- Subnet mask
- Default gateway



**Note**

If a default gateway is unavailable, use the IP address of a computer that is located on the same subnet as the InfraStruXure PDU and that is usually running. The InfraStruXure PDU uses the default gateway to test the network when traffic is very light. See “Watchdog Features” in the “Introduction” of the InfraStruXure Power Distribution Unit’s online *Network Management User’s Guide* for more information about the watchdog role of the default gateway.

## TCP/IP configuration methods

Use one of the following methods to define the TCP/IP settings needed by the InfraStruXure PDU:

- Device IP Configuration Wizard (See “Device IP Configuration Wizard” on this page.)
- BOOTP or DHCP server (See “BOOTP & DHCP configuration” on page 39.)
- Local computer (See “Local access to the control console” on page 42.)
- Networked computer (See “Remote access to the control console” on page 42.)

## Device IP Configuration Wizard

You can use the Device IP Configuration Wizard on a Windows NT<sup>®</sup> 4.0, Windows 2000, or Windows XP computer to discover unconfigured InfraStruXure PDUs and configure their basic TCP/IP settings.



**See also**

To configure one or more InfraStruXure PDUs by exporting configuration settings from a configured PDU, see “How to Export Configuration Settings” in the online *Network Management User's Guide* on the *Utility CD*.

1. Insert the InfraStruXure PDU *Utility CD* into a computer on your network.
2. Launch the Wizard, when prompted, or, if prompted to restart the computer, access the Wizard from the **Start** menu after the computer has restarted.
3. Wait for the Wizard to discover the first unconfigured InfraStruXure PDU, then follow the on-screen instructions.



**Note**

If you leave the **Start a Web browser when finished** option enabled, you can use **apc** for both the **User Name** and **Password** to access the InfraStruXure PDU through your browser.

## BOOTP & DHCP configuration

The **Boot Mode** Setting, a TCP/IP option in the InfraStruXure PDU's **Network** menu, identifies how the TCP/IP settings will be defined. The possible settings are **Manual**, **DHCP only**, **BOOTP only**, and **DHCP & BOOTP** (the default setting).



**Note**

The **DHCP & BOOTP** setting assumes that a properly configured DHCP or BOOTP server is available to provide TCP/IP settings to InfraStruXure PDUs. If these servers are unavailable, see “Device IP Configuration Wizard” on page 38, “Local access to the control console” on page 42, or “Remote access to the control console” on page 42 to configure the needed TCP/IP settings.

With **Boot Mode** set to **DHCP & BOOTP**, the InfraStruXure PDU attempts to discover a properly configured server. It first searches for a BOOTP server, then a DHCP server, and repeats this pattern until it discovers a BOOTP or DHCP server.



**Note**

For more information, see “BOOTP” on this page or “DHCP” on page 40.

**BOOTP.** You can use an RFC951-compliant BOOTP server to configure the TCP/IP settings for the InfraStruXure PDU.



**Note**

The BOOTP setting assumes that a properly configured BOOTP server is available to provide TCP/IP settings to APC InfraStruXure PDUs. If a BOOTP server is unavailable, see “Device IP Configuration Wizard” on page 38, “Local access to the control console” on page 42, or “Remote access to the control console” on page 42 to configure the TCP/IP settings.

1. Make sure that the **BOOTP** setting, a **TCP/IP** option in the InfraStruXure PDU's **Network** menu, is enabled.
2. Enter the InfraStruXure PDU's MAC and IP addresses, the subnet mask and default gateway settings, and an optional Bootup file name in the BOOTPTAB file of the BOOTP server.



See also

For the MAC address, look on the Quality Assurance slip included with the InfraStruXure PDU.

3. When the InfraStruXure PDU reboots, the BOOTP server provides it with the TCP/IP settings.

- If you specified a bootup file name, the InfraStruXure PDU attempts to transfer that file from the BOOTP server using TFTP or FTP. The InfraStruXure PDU assumes all settings specified in the bootup file.
- If you did not specify a bootup file name, the InfraStruXure PDU can be configured remotely by using Telnet or by using the Web interface: **User Name** and **Password** are both **apc**, by default.



See also

To create the bootup file, see your BOOTP server documentation.

**DHCP.** You can use a RFC2131/RFC2132-compliant DHCP server to configure the TCP/IP settings for the InfraStruXure PDU.



See also

This section briefly summarizes the InfraStruXure PDU communication with a DHCP server. For more detail about how a DHCP server is used to configure the network settings for a InfraStruXure PDU, see “DHCP Configuration” in the InfraStruXure Power Distribution Unit’s online *Network Management User’s Guide*.

1. A InfraStruXure PDU sends out a DHCP request that uses the following to identify itself:
  - A Vendor Class Identifier (APC by default)
  - A Client Identifier (by default, the InfraStruXure PDU’s MAC address value)
  - A User Class Identifier (by default, the identification of the InfraStruXure PDU’s application firmware)
2. A properly configured DHCP server responds with a DHCP offer that includes all of the settings that the InfraStruXure PDU needs for network communication. The DHCP offer also includes the Vendor Specific Information option (DHCP option 43). By default, the InfraStruXure PDU will ignore DHCP offers that do not encapsulate the APC cookie in the Vendor Specific Information option using the following hexadecimal format:

Option 43 = 01 04 31 41 50 43

where

- the first byte (01) is the code
- the second byte (04) is the length
- the remaining bytes (31 41 50 43) are the APC cookies





See your DHCP server documentation to add code to the Vendor Specific Information option. To disable the APC cookie requirement, see “Local access to the control console” on page 42.



To change the control console’s **DHCP Cookie Is** setting, use the **Advanced** option in the TCP/IP menu. See “Remote access to the control console” on page 42.

## Local access to the control console

You can use a local computer that connects to the InfraStruXure PDU through the console port on the InfraStruXure PDU monitoring unit to access the control console.

1. Select a serial port at the local computer, and disable any service that uses that port.
2. Use the configuration cable (940-0103) to connect the selected port to the console port on the InfraStruXure PDU monitoring unit.
3. Run a terminal program (such as HyperTerminal<sup>®</sup>) on your computer and configure the selected port for 9600 bps, 8 data bits, no parity, 1 stop bit, and no flow control, and save the changes.
4. Press ENTER to display the **User Name** prompt.
5. Use **apc** for the **User Name** and **Password**.
6. See “Control console” on page 43 to finish the configuration.

## Remote access to the control console

From any computer on the same subnet as the InfraStruXure PDU, you can use ARP and Ping to assign an IP address to an InfraStruXure PDU, and then use Telnet to access that InfraStruXure PDU's control console and configure the needed TCP/IP settings.



### Note

After an InfraStruXure PDU has its IP address configured, you can use Telnet, without first using ARP and Ping, to access that InfraStruXure PDU.

1. Use ARP to define an IP address for the InfraStruXure PDU, and use the InfraStruXure PDU's MAC address in the ARP command. For example, to define an IP address of 156.205.14.141 for an InfraStruXure PDU that has a MAC address of 00 c0 b7 63 9f 67, use one of the following commands:

– Windows command format:

```
arp -s 156.205.14.141 00-c0-b7-63-9f-67
```

– LINUX command format:

```
arp -s 156.205.14.141 00:c0:b7:63:9f:67
```



### See also

For the MAC address, look on the Quality Assurance slip included with the InfraStruXure PDU.

2. Use Ping with a size of 113 bytes to assign the IP address defined by the ARP command. For the IP address defined in step 1, use one of the following Ping commands:
  - Windows command format:  

```
ping 156.205.14.141 -l 113
```
  - LINUX command format:  

```
ping 156.205.14.141 -s 113
```
3. Use Telnet to access the InfraStruXure PDU at its newly assigned IP address. For example:  

```
telnet 156.205.14.141
```
4. Use **apc** for both **User Name** and **Password**.
5. See “Control console” on this page to finish the configuration.

## Control console

After you log on at the control console, as described in “Local access to the control console” on page 42 or “Remote access to the control console” on page 42:

1. Choose **Network** from the **Control Console** menu.
2. Choose **TCP/IP** from the **Network** menu.
3. If you are not using a **BOOTP** or **DHCP** server to configure the **TCP/IP** settings, select the **Boot Mode** menu. Select **Manual boot mode**, and then press ESC to return to the **TCP/IP** menu. (Changes will take effect when you log out.)
4. Set the **System IP**, **Subnet Mask**, and **Default Gateway** address values.
5. Press CTRL-C to exit to the **Control Console** menu.
6. Log out (option 4 in the **Control Console** menu).



**Note**

If you disconnected a cable during the procedure described in “Local access to the control console” on page 42, reconnect that cable and restart the associated service.

# How to Access a Network Management Interface on a Configured InfraStruXure PDU

---



**Disregard the procedures in this section if you have the APC InfraStruXure Manager as part of your system. See the *InfraStruXure Manager's Installation and Quick-Start* manual for access information.**

## Web interface

As your browser, you can use Microsoft® Internet Explorer 5.0 (and higher) or Netscape® 4.0.8 (and higher, except Netscape 6.x) to access the InfraStruXure PDU through its Web interface. Other commonly available browsers also may work but have not been fully tested by APC.

To use the Web browser to configure InfraStruXure PDU options or to view the event log, you can use either of the following:

- The HTTP protocol (enabled by default), which provides authentication by user name and password but no encryption.
- The more secure HTTPS protocol, which provides extra security through Secure Socket Layer (SSL) and encrypts user names, passwords, and data being transmitted. It also provides authentication of Network Management Cards by means of digital certificates.

To access the Web interface and configure the security of your device on the network:

1. Address the InfraStruXure PDU by its IP address or DNS name (if configured).
2. Enter the user name and password (by default, **apc** and **apc** for an Administrator, or **device** and **apc** for a Device Manager).
3. Select and configure the type of security you want. (This option is available only for Administrators.)



**See also**

See the chapter entitled “Security” in the InfraStruXure Power Distribution Unit’s online *Network Management User’s Guide* for information on choosing and setting up your network security. Use the **Web/SSL** option of the **Network** menu to enable or disable the HTTP or HTTPS protocols.

## Telnet and SSH

You can access the control console through Telnet or Secure SHell (SSH), depending on which is enabled. (An Administrator can enable these access methods through the **Telnet/SSH** option of the **Network** menu.) By default, Telnet is enabled. Enabling SSH automatically disables Telnet.

**Telnet for basic access.** Telnet provides the basic security of authentication by user name and password, but not the high-security benefits of encryption. To use Telnet to access an InfraStruXure PDU's control console from any computer on the same subnet:

1. At a command prompt, use the following command line, and press ENTER:

```
telnet address
```

As *address*, use the InfraStruXure PDU's IP address or DNS name (if configured).

2. Enter the user name and password (by default, **apc** and **apc** for an Administrator, or **device** and **apc** for a Device Manager).

**SSH for high-security access.** If you use the high security of SSL for the Web interface, use Secure SHell (SSH) for access to the control console. SSH encrypts user names, passwords, and transmitted data.

The interface, user accounts, and user access rights are the same whether you access the control console through SSH or Telnet, but to use SSH, you must first configure SSH and have an SSH client program installed on your computer.



See also

See the InfraStruXure Power Distribution Unit's online *Network Management User's Guide* for more information on configuring and using SSH.

## SNMP

After you add the PowerNet MIB to a standard SNMP MIB browser, you can use that browser for SNMP access to the InfraStruXure PDU. The default read community name is **public**; the default read/write community name is **private**.



Note

If you enable SSL and SSH for their high-security authentication and encryption, disable SNMP. Allowing SNMP access to the InfraStruXure PDU compromises the high security you implement by choosing SSL and SSH. To disable SNMP, you must be an Administrator; use the **SNMP** option of the **Network** menu.

## FTP and SCP

You can use FTP (enabled by default) or Secure CoPy (SCP) to transfer new firmware to the InfraStruXure PDU, or to access a copy of the InfraStruXure PDU's event logs. SCP provides the higher security of encrypted data transmission and is enabled automatically when you enable SSH.



**Note**

If you enable SSL and SSH for their high-security authentication and encryption, disable FTP. Allowing file transfer to the InfraStruXure PDU through FTP compromises the high security you implement by choosing SSL and SSH. To disable FTP, you must be an Administrator; use the **FTP Server** option of the **Network** menu.

To access the InfraStruXure PDU through FTP or SCP, the default user name and password are **apc** and **apc** for an Administrator, or **device** and **apc** for a Device Manager. In the command line, use the IP address of the unit.



**See also**

See the InfraStruXure Power Distribution Unit's online *Network Management User's Guide* to use FTP or SCP to retrieve log files from the InfraStruXure PDU or to transfer firmware files to the InfraStruXure PDU.

# How to Recover From a Lost Network Management Interface Password

---



Note

Disregard the procedures in this section if you have the APC InfraStruXure Manager as part of your system. See the *InfraStruXure Manager's Installation and Quick-Start manual* for information on recovering from a lost password.

1. Select a serial port at the local computer, and disable any service that uses that port.
2. Connect the serial cable (940-0103) to the selected port on the computer and to the console port on the InfraStruXure PDU monitoring unit.
3. Run a terminal program (such as HyperTerminal<sup>®</sup>) on your computer and configure the selected port as follows:
  - 9600 bps
  - 8 data bits
  - no parity
  - 1 stop bit
  - no flow control.
4. Press ENTER, repeatedly if necessary, to display the **User Name** prompt. If you are unable to display the **User Name** prompt, verify the following:
  - The serial port is not in use by another application.
  - The terminal settings are correct as specified in step 3.
  - The correct cable is being used as specified in step 2.
5. Press the **Reset** button on the InfraStruXure PDU monitoring unit. The Status LED will flash alternately orange and green. Press the **Reset** button on the InfraStruXure PDU monitoring unit a second time immediately while the LED is flashing to reset the user name and password to their defaults temporarily.
6. Press ENTER as many times as necessary to redisplay the **User Name** prompt, then use the default, **apc**, for the user name and password. (If you take longer than 30 seconds to log on after the **User Name** prompt is redisplayed, you must repeat step 5 and log on again.)
7. From the **Control Console** menu, select **System**, then **User Manager**.
8. Select **Administrator**, and change the **User Name** and **Password** settings, both of which are now defined as **apc**.
9. Press CTRL-C, log off, reconnect any serial cable you disconnected, and restart any service you disabled.





# Customizing and Updating the PDU

## Important Safety Instructions

---



APC does not recommend that you perform maintenance of the PDU while it is receiving input power. However, due to the critical nature of data center loads, this may occur. If you must perform maintenance while the PDU is receiving input power, observe the following precautions to reduce the risk of electric shock:

1. Never work alone.
2. Perform the maintenance only if you are a certified electrician who is trained in the hazards of live electrical installation.
3. Know the procedure for disconnecting electricity to the PDU and the data center in case of an emergency.
4. Wear appropriate personal protective equipment.
5. Use double-insulated tools.
6. Always follow local and site regulations when working on the PDU.

# PDU Orderable Part List

## Breakers

PD1P20ABBSD	single- pole, 20-amp breaker	PD3P20ABBSD	three- pole, 20-amp breaker
PD1P50ABBSD	single-pole, 50-amp breaker	PD3P80ABBSD	three- pole, 80-amp breaker
PD2P20ABBSD	two-pole, 20-amp breaker	PD3P100ABBSI	three- pole, 100-amp breaker
PD2P30ABBSD	two- pole, 30-amp breaker	PD3P150ABBSI	three- pole, 150-amp breaker

## Power Cables

30 A, 3-wire power cables		20 A, 3-wire power cables	
SKU Number	Description	SKU Number	Description
PDW7L6-30C	7-foot power cable	PDW5L21-20R	5-foot power cable
PDW9L6-30C	9-foot power cable	PDW7L21-20R	7-foot power cable
PDW11L6-30C	11-foot power cable	PDW9L21-20R	9-foot power cable
PDW13L6-30C	13-foot power cable	PDW11L21-20R	11-foot power cable
PDW15L6-30C	15-foot power cable	PDW13L21-20R	13-foot power cable
PDW17L6-30C	17-foot power cable	PDW15L21-20R	15-foot power cable
PDW19L6-30C	19-foot power cable	PDW17L21-20R	17-foot power cable
PDW21L6-30C	21-foot power cable	PDW19L21-20R	19-foot power cable
PDW23L6-30C	23-foot power cable	PDW21L21-20R	21-foot power cable
PDW25L6-30C	25-foot power cable	PDW23L21-20R	23-foot power cable
PDW27L6-30C	27-foot power cable	PDW25L21-20R	25-foot power cable
PDW29L6-30C	29-foot power cable	PDW27L21-20R	27-foot power cable
PDW31L6-30C	31-foot power cable	PDW29L21-20R	29-foot power cable
PDW33L6-30C	33-foot power cable	PDW31L21-20R	31-foot power cable
PDW35L6-30C	35-foot power cable	PDW33L21-20R	33-foot power cable
PDW37L6-30C	37-foot power cable	PDW35L21-20R	35-foot power cable
PDW39L6-30C	39-foot power cable	PDW37L21-20R	37-foot power cable
PDW41L6-30C	41-foot power cable	PDW39L21-20R	39-foot power cable
PDW43L6-30C	43-foot power cable	PDW41L21-20R	41-foot power cable
PDW45L6-30C	45- foot power cable	PDW43L21-20R	43-foot power cable
PDW47L6-30C	47-foot power cable	PDW45L21-20R	45-foot power cable

**Power Cables**

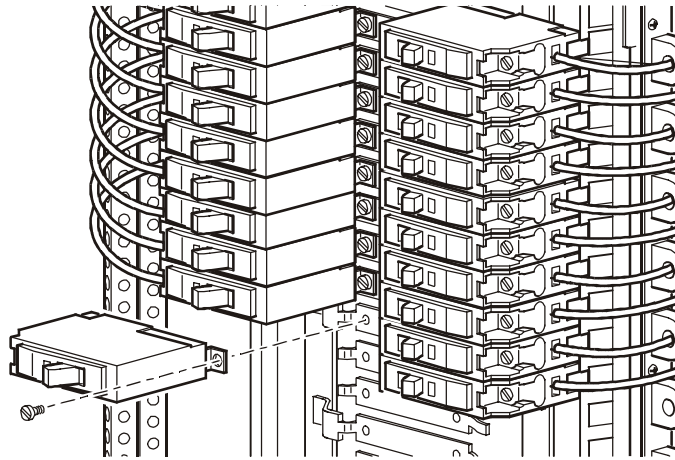
<b>30 A, 3-wire power cables</b>		<b>20 A, 3-wire power cables</b>	
<b>SKU Number</b>	<b>Description</b>	<b>SKU Number</b>	<b>Description</b>
PDW49L6-30C	49-foot power cable	PDW47L21-20R	47-foot power cable
PDW51L6-30C	51-foot power cable	PDW49L21-20R	49-foot power cable
PDW53L6-30C	53-foot power cable	PDW51L21-20R	51-foot power cable
PDW55L6-30C	55-foot power cable	PDW53L21-20R	53-foot power cable
PDW57L6-30C	57-foot power cable	PDW55L21-20R	55-foot power cable
PDW59L6-30C	59-foot power cable	PDW57L21-20R	57-foot power cable
PDW61L6-30C	61-foot power cable	PDW59L21-20R	59-foot power cable
PDW63L6-30C	63-foot power cable	PDW61L21-20R	61-foot power cable
PDW65L6-30C	65-foot power cable	PDW63L21-20R	63-foot power cable
PDW67L6-30C	67-foot power cable		
PDW69L6-30C	69-foot power cable		
PDW71L6-30C	71-foot power cable		
PDW73L6-30C	73-foot power cable		
PDW75L6-30P	75-foot power cable		

# How to Add Circuit Breakers and Power Cables

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## Add a circuit breaker on the PDU

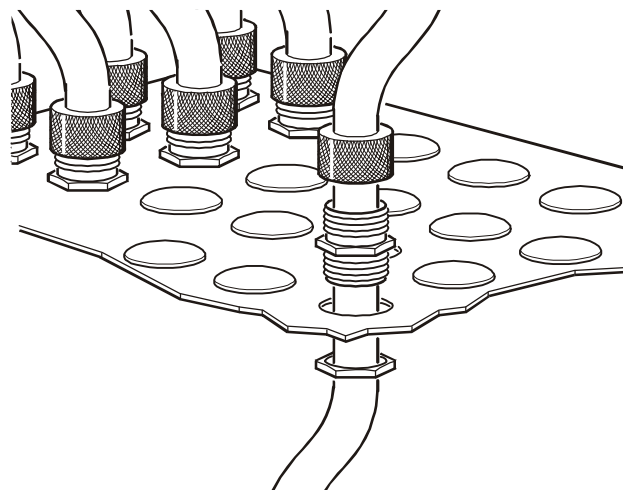
1. Snap and bolt the new circuit breaker into a position on the panel.
2. Remove the corresponding plastic blanking plate on the front panel of the PDU.



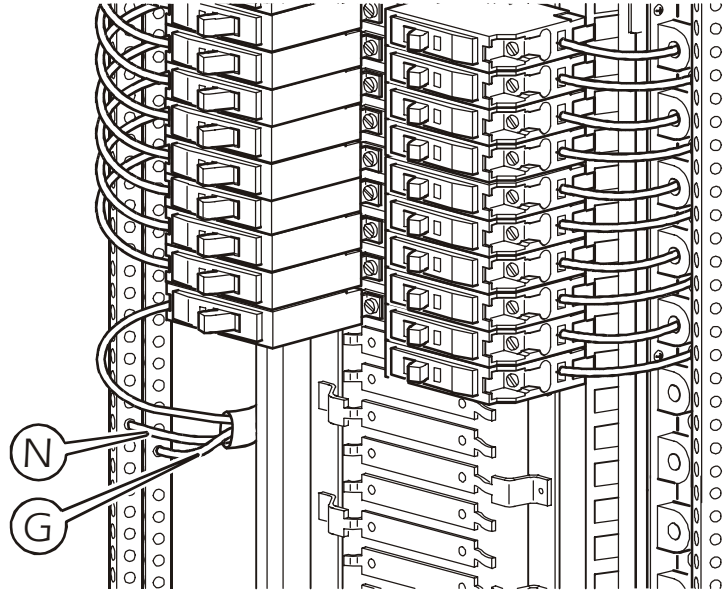
## Add a power cable to the PDU

Before adding a power cable, add a circuit breaker.

1. Install a strain-relief connector in any available knockout on the roof of the PDU.
2. Slide enough of the power cable through the strain-relief connector to reach the new circuit breaker.
3. Tighten the strain-relief connector.



4. At the front of the PDU, connect the power cord's individual wires:
  - a. If you have branch current monitoring installed, route the phase conductor through a current sensor. If it is a three-phase cable, route the L1, L2, and L3 wires through a current sensor.
  - b. Connect the L1, L2, and L3 wires to the circuit breaker(s). The illustration below shows single pole breakers; however, you can also connect three-pole breakers.
  - c. Connect the neutral wire to the closest open termination point on the Neutral Bar (N).
  - d. Connect the ground wire to the closest open termination point on the Ground Bar (G).



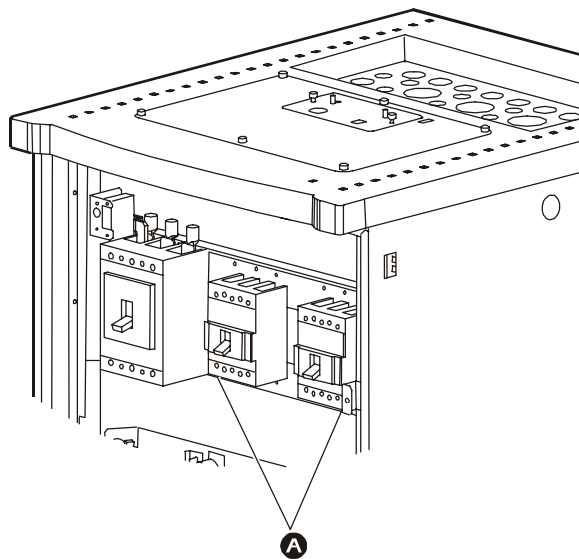
You can configure your InfraStruXure system through the InfraStruXure Build-Out Tool to use 3, 20 A, single-pole breakers to feed multi-circuit power cables supplying power to L-N loads. However, one 3-pole, 20 A circuit breaker must be used with any power cable and Rack PDU that feeds L-L loads (NEC, NFPA 70).

# How to Add a Sub-Feed Output Circuit Breaker to the PDU and Connect a Sub-Feed Power Cable

---

## Overview

As an option, you can add 150- or 225-amp sub-feed output circuit breakers (A) to the two (2) mounting bracket positions provided on your 150kW InfraStruXure PDU. These circuit breakers offer a means for distributing higher blocks of power to other equipment. If your PDU has already been configured with a subfeed breaker(s), refer to “How to connect the sub-feed cable to the circuit breaker” on page 56. To install a new circuit breaker, follow all of the instructions in this section.



The PDU must be powered down before adding a subfeed. For instructions on ensuring total power off, refer to “How to Ensure Total Power Off” on page 33 of this manual.

## How to attach the circuit breaker to the mounting brackets

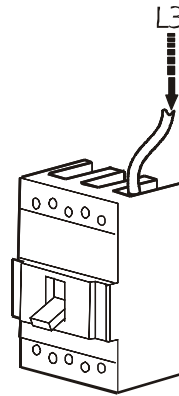
1. Mount the circuit breaker according to the instructions provided by the manufacturer.



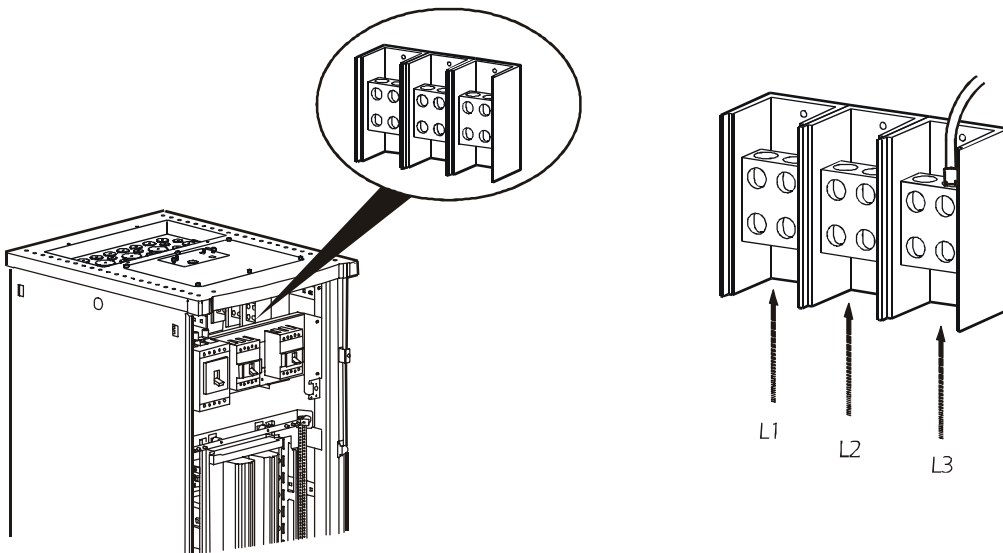
**Note**

Install a plastic insulating piece behind the circuit breaker before mounting it.

2. Remove the blanking plate from the door of the PDU and replace it with the faceplate supplied with the sub-feed breaker kit.
3. Using the provided hardware, fasten the **L3** cable to the top of the sub-feed circuit breaker you are installing, according to the following illustration. Torque to 70 in-lb (8 Nm).



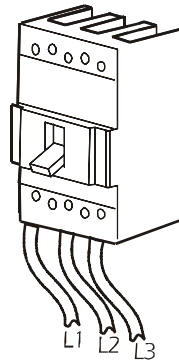
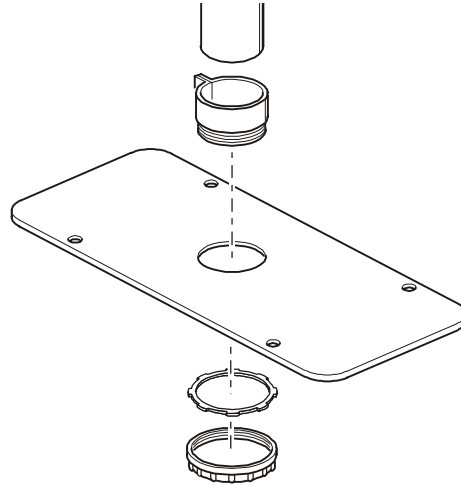
4. Insert the remaining (stripped) end of the **L3** cable into the **L3** lug of the terminal block inside the PDU. Torque to 275 in-lb (32 Nm). The following illustrations show the location of the terminal block inside the PDU and the point on the terminal block where the connection is made.



5. Repeat step 3 and step 4 for the remaining **L2** and **L1** cables.

## How to connect the sub-feed cable to the circuit breaker

1. Use a knockout punch to create an appropriately-sized hole in either the top or bottom gland plate on the PDU through which you will route the sub-feed cable. Use the top gland plate for overhead wiring and the bottom gland plate for underfloor wiring.
2. Re-attach the gland plate.
3. Install the conduit, fitting, and lock-nut.
4. Thread the sub-feed cable through the conduit and to the circuit breaker.
5. Connect the three-phase wires to the load side of the circuit breaker.



6. Connect the sub-feed **neutral wire** to the neutral bar on the panel (M8 studs are provided).
7. Connect the **ground wire** to one of the ground studs on the panel bracket (M8 studs are provided).



# How to Connect User Input Contacts and Relay Outputs to the PDU User Connection Plate

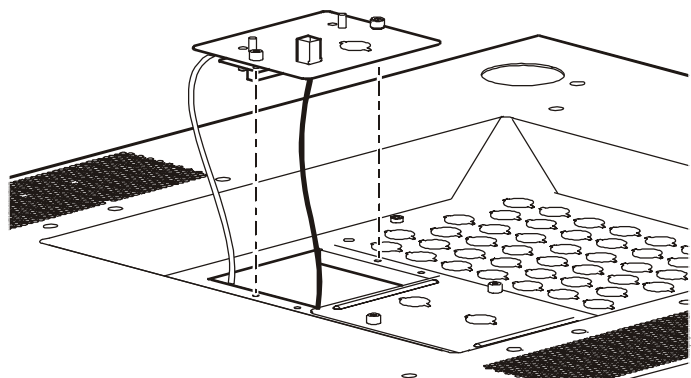
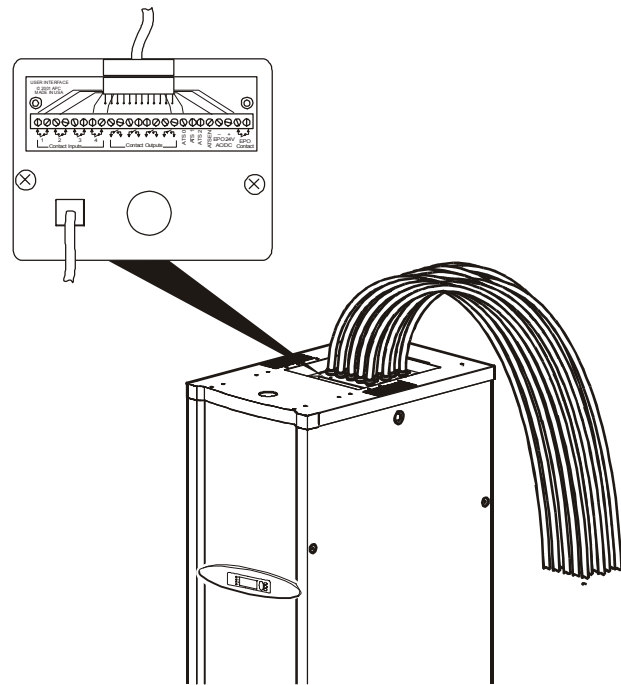
## Overview

Make contact closure connections (NO or NC) at the user connection plate to monitor dry contacts. You can make eight connections—four input contacts and four relay outputs.

The figure at the right shows the location of the user connection plate on the roof of the PDU enclosure.

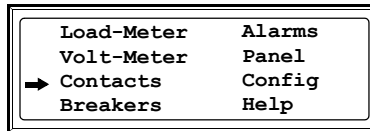
You can make connections from inside the enclosure, or you can remove the user connection plate and make your connections.

Remove the plate using a Phillips or standard screw driver to loosen the two captive screws. Use the knockout in the plate to route cables to and from the user connection on the plate. If you remove the plate, make sure that you do not disturb the existing connections.

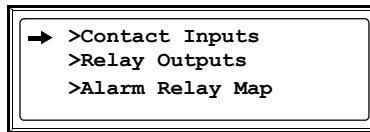


## How to connect contacts to the PDU monitoring unit

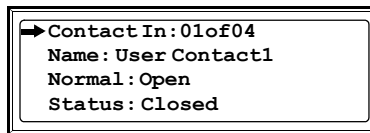
1. Choose one or more contact number(s) on the **User/EPO contacts** port on the user connection plate to which you will connect the contacts. The user connection plate connects to the PDU monitoring unit.
2. From the PDU display interface:
  - a. Press the ESC or ENTER key to go to the top-level menu screen.
  - b. Select **Contacts** on the top-level menu screen, and press the ENTER key.



- c. Select **Contact Inputs** and press ENTER to display the contact inputs screen.



- d. Select **Contact In** and press the ENTER key to select the number of the contact you are connecting. The continue arrow ⇕ will appear next to the contact number.



- e. Press the Up or Down arrow key to select the appropriate contact number, and press the ENTER key.
  - f. Press the Down arrow key to enter a unique **Name** for the contact and to configure the **Normal** state of the contact (Open or Closed). The default **Normal** state is Open. Press the ENTER key to select the item to configure.



**Note**

You will be prompted for your password to configure these items.

3. Connect contact wires (300V-rated cabling required) to the **User Contacts** terminal block on the user connection plate. You will need a 2.5-mm standard screwdriver.
4. Run the wires from the terminal block out the roof or under the floor of the PDU to your contact's location.



**Warning**

**Ensure that wires are properly retained and away from high voltage lines and breakers.**



See "Relay Outputs" on page 57 for relay output specifications.



## Overview

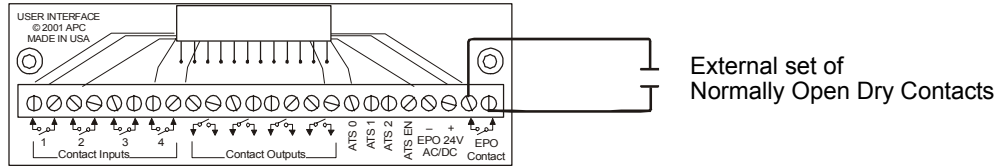
**Note**

The diagram illustrates the connection of a cable to a terminal block. A cable with multiple conductors is shown entering a terminal block. The terminal block has labels for 'Main Interference', 'Common Input', 'Common Output', 'AC Input', 'AC Output', and 'Common'. A callout box provides a detailed view of the terminal block's internal wiring and labels.

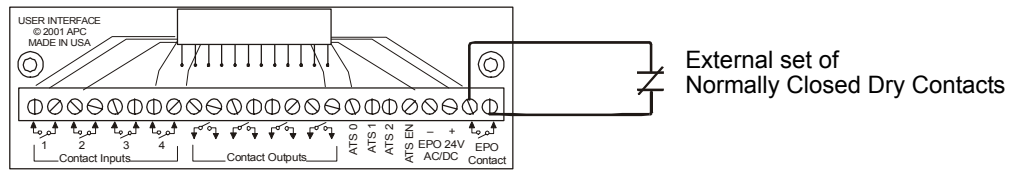
## Connect an EPO switch to the user connection plate and test the switch

1. Connect the switch to the EPO connection point terminals located on the bottom side of the PDU user connection plate. Read the label next to the terminal block to determine which terminals to connect to for the signal type you are using:

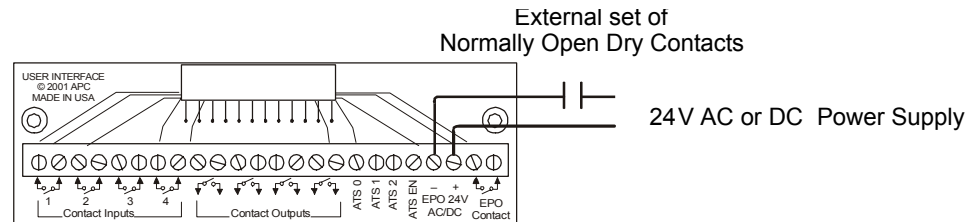
### – Contact Closure—Normally Open



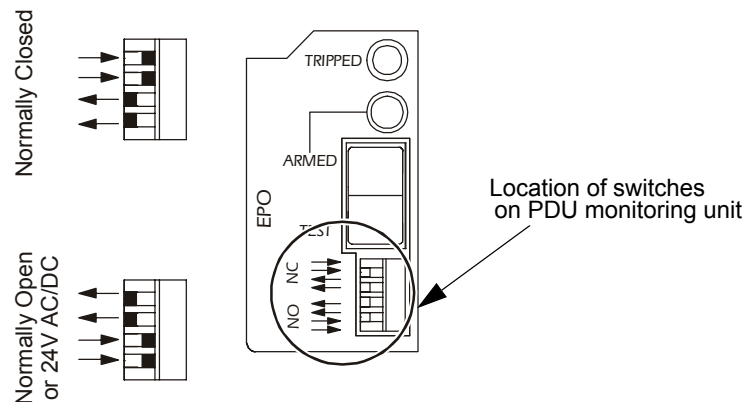
### – Contact Closure—Normally Closed



### – 24VAC/VDC—Normally Open



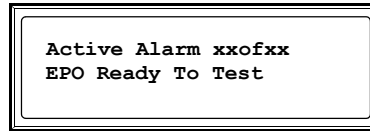
2. Verify that the EPO DIP switches on the PDU monitoring unit are configured properly for the signal type you are using. The labels above the switches and the figure below show the correct settings for both the Normally Open (NO) and Normally Closed (NC) position.



The default setting on the EPO interface on the PDU monitoring unit is for a **Normally Open (NO)** switch.

3. Test the EPO switch to ensure that it is wired and working correctly:

- a. Place the **Arm/Test** rocker switch in the **Test** position. The EPO state LEDs will be off and the PDU display interface will show the following alarm (in addition to any other active alarms):



- b. Engage the EPO switch. (If your switch is momentary, engage it with one person watching the EPO state LEDs, and another at the EPO switch.)
- c. Observe the EPO LEDs. If the switch is wired and working properly, when the switch is engaged, both of the EPO state LEDs are red.
- d. If the test was successful, place the **Arm/Test** rocker switch back to the **Arm** position. The PDU display interface will clear the EPO test mode alarm. If the test was not successful, see the troubleshooting chart:

Problem	Action
Neither state LED was red when EPO switch was engaged	<ul style="list-style-type: none"> <li>• Check the wiring to your EPO switch.</li> <li>• Check to make sure the EPO DIP switch configuration is correct for your switch (NO or NC). See step 2 on the previous page for proper configuration instructions.</li> </ul>
Only one of the state LEDs was red when EPO switch was engaged	<ul style="list-style-type: none"> <li>• Check to make sure the EPO DIP switch configuration is correct for your switch (NO or NC) and test again. See step 2 on the previous page for proper configuration instructions.</li> <li>• If the switch is configured correctly and both LEDs are not red after testing again, contact customer support at a number on the back cover of this manual.</li> </ul>

- e. Repeat this test for each EPO switch installed.
4. Ensure that the **Arm/Test** rocker switch is in the **Arm** position on the monitoring unit.

## **Safety warnings**

Hazardous voltage from the branch circuit must be isolated from the 24VAC, 24VDC, and contact closure. 24VAC and 24VDC are considered Class 2 circuits as defined in Article 725 of the National Electrical Code (NFPA 70) and Section 16 of the Canadian Electrical Code (C22.1).

A Class 2 circuit is a source having limited voltage and energy capacity as follows:

- a. If an Inherently Limited Power Source, voltage and energy are limited to less than 30VAC, less than 30VDC, and 8A.
- b. If not an Inherently Limited Power Source, voltage and energy are limited to less than 30VAC, less than 60VDC, 250VA, and the current is limited to 1000/V max. The fuse is limited to 5A if less than 20VAC or 20VDC, or 100/V maximum if less than 30VAC or 60VDC.

If you choose to use a 24VAC, 24VDC, or contact closure connection to the EPO, use one of the following UL-listed wire types:

- CL2 Class 2 cable for general purpose use
- CL2P Plenum cable for use in ducts, plenums, and other space used for environmental air
- CL2R Riser cable for use in a vertical run shaft from floor to floor
- CL2X Limited Use cable for use in dwellings and for use in a raceway
- For installation in Canada, the cable should be CSA Certified, type ELC (extra-low-voltage control cable).

If you do not use a CL2 cable, route the EPO wiring in conduit that does not contain any branch circuit wiring.

# How to Download Firmware Updates

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See also

To download a firmware upgrade and transfer it to your PDU, see “File Transfers” in the InfraStruXure PDU’s online *Network Management User’s Guide* on the *Utility CD*.

## From a local computer

1. Select a serial port at the local computer, and disable any service that uses that port.
2. Use the configuration cable to connect the selected port to the console port on the PDU monitoring unit.
3. Run a terminal program (such as HyperTerminal®) and configure the selected port for 9600 bps, 8 data bits, no parity, 1 stop bit, and no flow control. Save the changes.
4. Press ENTER twice to display the **User Name** prompt.
5. Enter your **User Name** and **Password** (both **apc**, for administrators only) and press the ENTER key.
6. From the **Control Console** menu, select **System**, then **Tools**, then **File Transfer**, then **XMODEM**.
7. The system will prompt you with `Perform transfer with XMODEM -CRC? Type Yes` and press ENTER.
8. The system will then prompt you to choose a transfer rate and to change your terminal settings to match the transfer rate. Press ENTER to set the PDU to accept the download.
9. In the terminal program, send the file using XMODEM protocol. Upon completion of the transfer, the console will prompt you to restore the baud rate to normal.



Caution

Do not interrupt the download.

The PDU network management interface will reboot when the download is complete.





# Specifications

## 150kW InfraStruXure PDU

Electrical	PD150G6F	PD150L6F
Input		
Nominal voltage	480 V, 3-phase	600 V, 3-phase
Voltage AC	3-phase, 3-wire	3-phase, 3-wire
Frequency	60Hz , ±3 Hz	60 Hz, ±3 Hz
Max. current per phase	200 A	150 A
Load capacity	150,000 VA	150,000 VA
Max. crest factor	3	3
Output		
Nominal voltage	120, 208 V 1-phase and 208 V 3-phase	
Full load rating	150kVA	
Nominal current	416 A	
Distribution breaker size	225 A (maximum size)	
Main panel breaker	400 A MCCB	
Subfeed breaker	150 A/225 A	
Relay Outputs		
Nominal switching capacity	1 A at 30 VDC	
Maximum switching power	30 W	
Maximum switching voltage	60 VDC	
Maximum switching currant	2 ADC	
Maximum carrying current	2 ADC	
Surge ratings	2kV per Bellcore TA-NWT-001089 1.5kV per FCC part 68	
Physical	PD150G6F	PD150L6F
Dimensions (H × W × D)		
PDU	81 × 29 × 36 in (2060 × 740 × 910mm)	
Shipping	86 × 36 × 48 in (2180 × 910 × 1220mm)	
Weight		
PDU only	1500lb (680kg)	1400lb (635kg)
PDU with 28 cables	1900lb (862kg)	1800lb (816kg)
Shipping	1950lb (885kg)	1850lb (839kg)

Physical	PD150G6F	PD150L6F
<hr/>		
Transformer		
Type	Step-down	
Configuration	Delta to WYE	
Warranty	2 years parts	
<hr/>		
Environmental		
<hr/>		
Temperature		
Operating	32 to 104° F (0 to 40° C)	
Storage	5 to 113° F (–5 to 45° C)	
Humidity		
Operating	0–95%, non-condensing	
Storage	0–95%, non-condensing	
Elevation		
Operating	0 to 3,333 ft (0 to 1016m)	
Storage	0 to 30,000 ft (0 to 9144m)	
<hr/>		
Compliance		
<hr/>		
Approvals	cUL Listed, UL Listed	
<hr/>		

# Product Information

## Warranty

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### InfraStruXure Standard Warranty

APC warrants that all components of the InfraStruXure system will be free from defect in material and workmanship for a period of two years from the date of start up when start up has been performed by APC authorized service personnel\*. If assembly services are included in the original purchase and are also performed by APC authorized service personnel, APC offers an additional year of warranty at no additional charge. In the event that the system fails to meet the forgoing warranty, APC shall repair or replace, at its sole discretion, any such defective parts. Under this warranty, APC will ship all parts to your site at no cost to be available for you the next business day after APC is notified of this requirement. If you choose to upgrade the system to include an on site contract, APC offers modular service packages to match your needs.

Each point product incorporated into the system has a separate factory warranty that is applied when sold as a standalone unit. When incorporated into an InfraStruXure solution, the unit will be covered by the InfraStruXure warranty. In cases where one warranty favors the customer over the other, the stronger of the two warranties will take precedence.

\*All warranties are null and void unless installation and startup are performed by authorized APC Global Services service centers.

APC SHALL NOT BE LIABLE UNDER THIS WARRANTY IF ITS TESTING AND EXAMINATION DISCLOSE THAT THE ALLEGED DEFECT IN THE PRODUCT DOES NOT EXIST OR WAS CAUSED BY PURCHASER'S OR ANY THIRD PERSON'S MISUSE, NEGLIGENCE, IMPROPER INSTALLATION OR TESTING, UNAUTHORIZED ATTEMPTS TO REPAIR OR MODIFY, OR ANY OTHER CAUSE BEYOND THE RANGE OF THE INTENDED USE, OR BY ACCIDENT, FIRE, LIGHTNING OR OTHER HAZARD.

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## APC Three-Phase Systems

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- a. The UPS system will be configured in a manner that will provide N+1 power redundancy to the critical load,
- b. The end-user customer assumes all risks and signs the *APC System Configuration and Use Form*, and
- c. The customer and operators of the APC UPS system agree to indemnify and hold APC and its affiliates and subsidiaries harmless for any and all claims arising out of the systems use in such applications.

The term *life-support device* includes but is not limited to neonatal oxygen analyzers, nerve stimulators (whether used for anesthesia, pain relief, or other purposes), autotransfusion devices, blood pumps, defibrillators, arrhythmia detectors and alarms, pacemakers, hemodialysis systems, peritoneal dialysis systems, neonatal ventilator incubators, ventilators (for adults and infants), anesthesia ventilators, infusion pumps, and any other devices designated as “critical” by the U.S. FDA.

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# How to Obtain Service

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If you ordered on-site service, see your entitlement certificate and terms and conditions of the service before following the procedure described below. An on-site serve contract entitles you to an on-site visit by an APC technician to assess the issue, determine the problem, and replace parts, if needed. (Response time varies per contract).

## How to contact APC

Customer support for this or any other APC product is available at no charge in any of the following ways:

- Visit the APC Web site to access documents in the APC Knowledge Base and to submit any customer support requests.

- **www.apc.com** (Corporate Headquarters)

Connect to localized APC Web sites for specific countries, each of which provides customer support information.

- **www.apc.com/support/**

Global support searching APC Knowledge Base and using e-support.

- Contact an APC Customer Support center by telephone or e-mail.

- Regional centers:

Direct InfraStruXure Customer Support Line	(1) (877) 537-0607 (toll-free)
APC Headquarters U.S., Canada	(1) (800) 800-4272 (toll-free)
Latin America	(1) (401) 789-5735 (USA)
Europe, Middle East, Africa	(353) (91) 702000 (Ireland)
Japan	(0) 35434-2021
Australia, New Zealand, South Pacific area	(61) (2) 9955 9366 (Australia)

- Local, country-specific centers: go to **www.apc.com/support/contact** for contact information.

Contact the APC representative or other distributor from whom you purchased your APC product for information on how to obtain local customer support.

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APC headquarters U.S., Canada	(1)(800)800-4272 (toll free)
Latin America	(1)(401)789-5735 (USA)
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